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UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Administration
Bureau of Plant Industry, Soils, and Agricultural Engineering
And
Food Distribution Administration
Cotton and Fiber Branch

Cotton Ginning Laboratory
Stoneville, Mississippi

April
1943

WARTIME CONTRIBUTION OF THE COTTON GINNING INDUSTRY

The cotton-ginning industry's contribution to the war program is becoming increasingly greater each year by virtue of the fact that higher qualities of cotton, cottonseed, and linters are being demanded to meet military requirements. Ginners are being asked to preserve and improve various qualities of ginned products through good ginning in spite of a shortage of repair parts and machinery replacements and a scarcity of trained gin workers. Undoubtedly this problem will become increasingly difficult as the war continues. Moreover, shortage in pickers will cause more cotton to be poorly harvested and weather damaged now than under peacetime circumstances. These conditions make the ginning problem all the more complicated. It becomes more important than ever before for the ginner to take good care of gin machinery and to employ the best operating practices in order to prolong the life of the machinery.

Timely Inspection and Early Preparations

In improving ginning facilities for the 1943 crop, it is advisable for ginners to take advantage of the quarterly "PRP" allotments given to manufacturers for repairs and maintenance by making early inspections of equipment and careful planning of repairs in place of a repetition of last year's final rush activity which was "too late" and perhaps "too little" in some cotton gins. Those ginners across the Cotton Belt who expect to operate their plants for the genuine benefit of the nation must begin at once to survey their needs, and to find out where and how they are going to fill them.

Recently priority application procedure for ginning materials have been ified so that Regional and District War Production offices can now exter s sufficiently high to permit prompt deliveries of necessary repairs a ance items valued up to $500. Thus advantage should be taken of the ly "PRP" allotments, and the assistance given by the direct and simpl - ocedure in obtaining ratings.

ners are being urged to make repairs, replacements, and other gin im- nts before the first bale of cotton approaches gin doors. The nearer son comes, the more difficult it will be to avoid excessive expenditures h material and skilled labor. To meet the situation most wisely and tively, the first step is to start from a sound foundation--that of ghly clean premises and ginning equipment, because a dependable appraisal be made otherwise.

A list of items of importance, alphabetically arranged, has been found to be convenient and a good check on gin machinery. Such a list follows:

Airblast gauge
Airline cleaner
Bearings, main line shaft
, jack, counter and stub
, machinery, all items
, fans and blowers
, pumps and screw
, gin stands
, engine
Belts , all
Belt distributor
Brush cylinders
Building, foundation
, floors
, superstructure
Cleaners, overhead
Condenser, complete with connections
, lint slide, doffin
, roller and kicker
Clutches and belt shifters
Conveyor distributor
Conveyor, seed
Conveyor, trash
Couplings, shaft
Couplings, or bands for air pipe
Counter shafting for condenser & tramper
Drives, main
, individual
, reverse and special idlers
Drier and manifolds or connections
, source of heat
, fan
, hot air and cold air piping
, steam piping
, oil burner piping
Droppers, see separator & seed
Engine, main
, auxilliary
Elevators, screw or bucket
Extractor, Master overhead
Extractor-cleaner-feeders
, hull manifold pipe
, hull fan connections
Fan, cotton suction
, hull
, airblast
, drier
, seed blow
, cotton house unloader
Flue, lint, complete
Flues, gin connecting
Gin stands
Gears, tramper
Grease cups
Gauges and thermometers
Idlers
Jack shafts
Kickers, condenser
Ladders, steps, platforms
Mote and trash piping
Main gin motor
Motor for press
Motor for cotton house unloader
Nozzles, airblast
Packing, ram gland
, press pump plungers
, fuel oil burner pump
Picker rollers, assembly
, pulleys for gin speed up
Piping, air, cotton, valves & fittings
, hull discharge
, seed blow, valves & fittings
, drier fan connections
Press, cotton and press boxes
, column and turn table
, follower blocks and platens
, pump outfit or screw outfit
, ram piping and valves
Pulleys, tight and loose
, saw speed up
Platforms for machinery
Saw cylinders
Scales, wagon
, bale
, seed
Seed handling, belts
, elevators
, troughs
Separator or dropper
Seed dropper
Suction telescope, wagon
, overflow
Tramper, complete
Unions, oil & water pipe
Vee belts and sheaves
Vacuum wheels, all
Valves, for cotton and seed
, for water and oil
Wiring, electric light
, signal
Weights, counter for telescope
, counter for press do

A logical cross check against the foregoing alphabetical list for needed repairs, replacements, or modernization of machinery, is to trace the route of the seed cotton through the ginning processes and note needed repairs or replacements along the way.

Overhauling Fans, Piping, and Conveying Systems

Modern cotton gins are equipped with pneumatic systems for handling seed cotton for ginning, and for disposing of the various products of the processes. Fans, piping, conveyors, elevators, and droppers or separators comprise the principal units of this group. Their operation generally requires about 40 percent of the total power consumed in a ginning plant. The importance of these processes in wartime economy is evident because they should be so operated as to conserve as much electrical energy and fuel as possible while fully performing the functions for which they are built.

Gin telescopes in cotton storage houses and ginning plants may be a source of waste power, if they are either oversize or defective. Gin telescopes of 9 to 10, 10 to 11, and 11 to 12 inches have proved to be most economical in 3-, 4-, and 5-stand outfits respectively. If telescopes are defective at the flexible joints or suction ends, they can and should be repaired. Brazing may prove quick and cheap in attaching hand grips to the end bands; and cutting off the frayed or broken nose of a telescope is desirable, even if the pipe is slightly shortened when the end band is moved up to firm metal.

Oversize telescopes may be cut down in size or changed from outside to inside sleeve types. Another simple method of power saving is to trade the overflow telescope with the wagon telescope if both have the same size flexible joint. In standard practice the latter is usually one or two sizes smaller and is not so badly worn.

Timely inspection of gin piping for simplification and conservation on repair parts may show that one or more elbows can be eliminated and that more direct lines can reduce the lengths of runs. These changes are beneficial because they provide spare parts for replacements, bring about better cotton handling conditions, and reduce the friction losses in the pipe. Eliminating leaks at pipe joints, saving power, and improving the suction may be done by using gummed paper seals under the bands inside the buildings, and painted cloth strips, applied while wet, beneath the bands on exterior piping exposed to the weather.

Galvanized sheet metal for piping is almost unobtainable in some sections of the country. Black sheet metal, well painted on the outside, will serve for wartime repair sections of interior piping and other items. Substitutes for sheet metal are now successfully employed in other industries, and these can also be used by the ginning industry. For instance, a moderate length of exterior hull piping can be made of 4 strips of pressed-wood fiber or lumber, put together in such a way as to have a diamond-shaped cross section to give a weather ridge, and painted after caulking with putty on the seams exposed to rain. Pipes of wood or pressed-wood fiber are now in use at some gins and have proved to be satisfactory. They are usually square in cross section, and the inside dimensions are approximately equal to the diameter of the worn-out galvanized pipe which is replaced. Top joints may be covered with strips of galvanized iron to act as a weather ridge.

Revision of trash-handling systems are practicable in some gins which do not blow seed with exhaust air of their cotton suction fans. In two-story gins, many gin layouts are such that the trash from feeders and stands can be dropped by gravity into the cotton fan discharge pipe through either a small dropper or with a "heel" to create suction where the trash enters the blow pipe. This method eliminates trash augers and simplifies the gin set-up.

Fans present maintenance problems to the ginners, especially where they are subjected to cutting and destructive volumes of dust-laden air. The present practice of welding or brazing defective wheels is excellent and is being used to avoid purchase of new wheels. If the blades of the fan wheels are straight and unshrouded, repairs to them may be made with pieces of old belting, trimmed to equal size and equal weight before attaching to the blades. Adequate fan capacity may be secured in this same manner, without the necessity of a new fan, by extending the repair strips beyond the tips of the metal blades to a point where they will safely clear the scroll. When the fan is running, these blades of belting do not bend back but stand out as rigidly as steel paddles. They must, therefore, clear the sides and scroll of the fan. After repairs are made, fan wheels must be balanced to operate efficiently.

Greater fan pressure and volume can be gained by longer and wider blades within the same casing. Thus the equivalent of a size larger fan is usually feasible in present casings by increasing the wheel diameters an inch or so with belting, leather or steel extensions, or by widening the wheel to a maximum which will still give running clearance within the casing. Suction as well as pressure will be increased by lengthening the fan blades and volume will be increased by either lengthening or widening of blades or both.

Ball bearings for fans are still available on low preference ratings if obtained from the fan manufacturers, but they may be more difficult to secure from some jobbers because of war-production rulings. Good ring-oiled bearings should be rebabbited instead of being discarded. They do not require appreciably more power than ball bearings when they are well lubricated, and their low maintenance cost and easy conservation make them worth keeping during war times.

Leaky separators constitute a real source of power waste and should be kept in first-class condition as to joints, seals, and screens if best operation is to be obtained and losses minimized.

Seed and trash screws or auger systems require about 1/2 horsepower per ten feet of length. In runs of more than 100 feet, therefore, the pneumatic handling of seed begins to be economical because pressure systems with small piping can blow seed 200 feet with about 5 horsepower. Used pipe on hand and a need for pure seed may dictate changes from screw conveyors to blow systems under such circumstances. To keep the seed clean for linters used for explosives a separate seed blow fan should be used.

Putting Cleaners and Extractors Into Shape

With the definite tendency toward careless harvesting and longer exposure of cotton to weather damage in the fields because of manpower shortages, the need for more effective cleaning and extracting of seed cotton prior to ginning is becoming pronounced, and timely repairs to such equipment more urgent.

The type and combination of cleaning and extracting machinery varies in cotton gins in different sections of the cotton belt, with extractor feeders rapidly becoming standard equipment in all areas for removing leaf trash, burs, and stems from seed cotton to improve the grade of the ginned lint. The repairs needed vary for different areas, but will be especially in evidence where rough harvesting methods are extensively practiced.

While the newer seed cotton cleaning installations present no serious problems in maintenance and repair to provide maximum efficiency in cleaning, they should nevertheless receive whatever servicing is needed; and the older types, which for the most part are of wood, must have more frequent attention.

Scarcity of steel, a critical war material, makes the repair of cleaners and extractors somewhat difficult and is likely to challenge the ingenuity of ginners. Bolts and other hardware are obtainable through some sources, but screening and new steel replacement cylinders are subject to priorities.

Wooden bodies of cleaners should be no bar to long life and good service, if they are carefully overhauled and made airtight. Flexible mastic compounds are preferable to hard putty for filling the cracks. If the cracks are too large for compound or putty alone, first calk with a soft "rope" of cotton, then apply the mastic compound and follow with a coat of paint. All loose bearings should be tightened and if of ring oiling type they should be re-babbitted, if they have "play". If there are ballbearings on the cleaner, remove and wash with kerosene or tractor fuel and refill with 600-W or other recommended heavy oil or that grade of grease which will not become soapy and useless within a short time. The sealing felts should be given special attention, because they guard the bearing against dust and grit.

Check the clearance between the screens and the cleaner spike tips when the cleaner is idle by trying to put the index finger between the spike and the screen. The spacing is about right when there is barely enough clearance for the index finger. Where screens are torn loose from frame pieces, new pieces should be inserted or the frame mended with quality glue or plastic wood. The cylinders themselves may be cheaply repaired with heavy wire wrapping if the staves are loose and battered, but if the spikes screw in and are loose, new staves will be needed.

When a cleaner cylinder is removed from the body of the cleaner, and is mounted on a pair of supports which will resist a heavy pull, a No. 10 or larger wire may be tightened around the drum with a winch-like action, and the joints for fastening can be made by welding or brazing before the wire is cut. This will provide economical methods of repair for most cylinders in all sorts of ginning machinery, if there are three places of wrapping - namely, both ends and center. An advantage of this method is that the cylinders are seldom thrown out of balance and the wire bindings can be placed to miss spacing of spikes or other parts. If there are angle flights on the cylinder, and their bolts or lag screws are loose, a notch near the ends and center of each flight can be sawed out so that the wire can be sunk to the foot of the flight. Then

the wire can be drawn up tightly and welded or brazed.

The foregoing repairs will be satisfactory for many airline and gravity cleaners and enable them to render additional service. Similar repairs may be made for overhead or master extractors and extractor feeders. The wire method of banding toothed and channel rings on these extractors is believed to be preferable to the welding or brazing of the rings at their ends when the fastening nails or screws have become loose. Worn out toothed segments of the extractor can be discarded and repairs can be made without disturbing other bands to any extent. However, if the nails are merely loose in the wood, the teeth bands can be advanced a bar on the cylinder and renailed.

Lubrication of cleaners and overhead extractors has caused trouble in many gins - not because it was neglected, but rather because too much light oil or grease was used when a moderate amount of heavy oil would have served longer and better without drip. If in doubt on lubrication for ball bearings on cleaners and extractors, use medium viscosity oil or No. 2 grease until more explicit directions are secured from the factory.

The application of hot air to overhead cleaners has generally improved the effectiveness of the cleaner and the handling of damp cotton as well. With the wartime restrictions and rationing of new drying equipment to some extent, the use of hot air in cleaners may become the only opportunity some ginners may have in small gins for providing drying service to their patrons. From 700 to 1000 cubic feet of hot air is distributed over the cylinders, and the better the dirt hopper beneath the screens is vented, the better the average gravity cleaner will respond to hot air. Wooden cylinders, when banded with the wire as previously mentioned, can be subjected to moderate air temperatures of about 160° F without any operating difficulties.

Inspection and overhaul of drying equipment should include cleaning of all screens and heater surfaces, the washing down or blowing out of radiators, the removal of air filters, the thorough cleaning of the source of heat, and ample protection against plugging of important control ports on gas or butane fuel apparatus by dirt-daubers and other insects. The importance of giving cotton driers proper attention, especially during operation, cannot be over-emphasized. The drying process not only aids in removing excess moisture and contributes to smoother ginning but also enhances the cleaning effects on trashy cotton enough to significantly improve the grade. Driers are one of the most important processes in ginning as indicated by their rapid adoption. In 1930 only fifteen cotton gins employed the government drying process compared with more than 2,300 driers or 21 percent of the active gins during 1942.

Repairing Distributors and Feeders

Distributors are the main artery between overhead machinery, or wagon suction, and the feeders of a cotton gin. Their proper maintenance is vital to continuous operation of the gin plant at maximum capacity. Valuable time is saved and costly breakdowns are prevented by careful inspection, servicing, and replacing of weak parts. Some types of distributors, principally the older designs, require more attention than others.

While the trend in distributor installations is toward the modern conveyor, or auger type, at least 15 percent of the gins in the Cotton Belt, mostly located in the Southeastern states, are still equipped with pneumatic distributors or elevators. About 60 percent are of the belt type, and the remainder, conveyor type.

Pneumatic distributors usually have sheet metal bodies, with internal parts of wood, canvas, and wire screen. Inspect the interior of each pneumatic chute and all parts of the distribution trunk which supplies them. A trip valve or mechanically operated "cut-off" valve, timed to periodically provide and stop suction, is a part of the main distribution trunk. Its worm and gear may need replacement or repair, and lubrication. Some ginners run these outfits under such dusty conditions that their moving parts are badly abrazed by grit and dust. A protective cover should be worth while if the wear is excessive. The pneumatic "elevators" or "chutes" may have broken glass windows at the inspection ports, or split wooden valves for by-passing, or torn and defective canvas boots on the lower trunk where they discharge into the gin feeders. Each of these parts need careful repair.

Belt distributors of wooden body design require frequent inspection because they may become warped or twisted by settling of the building or by being pulled out of line by braces attached to sagging walls. Weight of machinery imposed upon the distributor may still further aggravate this misalinement. The alinement and leveling of the distributor are very important. To a lesser degree, steel distributor bodies may become similarly affected, but they are not so liable to become broken. With either kind the belt pulleys should always be centered and not allowed to become worn by rubbing on the sides because fires are frequently started from this source. The belts are a constant source of trouble in some gins, chiefly because of slackness or of pulley and box misalinement. A loose belt causes the spikes and flaps to become worn and loosened, and when the spikes are unfastened they drop into the feeders with considerable resulting damage. The belts should be kept tight enough to prevent slipping, sagging, and breaking. Bearings on the driving and driven ends of all distributors should also be inspected. A coat of paint on wooden and steel distributors is protective and beneficial. It should be applied after the repairs have been completed.

Improved conveyor distributors are almost trouble-free but their supports, bearings, and couplings between flights should be examined and lubricated.

The repair and overhaul of feeders of all sorts is essential to high quality and efficient ginning. Repairs to the cylinders may be made in the same manner as was described for overhead cleaners and extractors. Wire bindings on the cylinders, shifting of toothed channels to new nailing positions, replacement of faulty wooden nailing ribs or staves, and new bolts for broken ones are necessary repairs.

The regulation and feeding controls vary from old tighteners on a slipping belt to the latest variable speed devices. They also include "pancake" type of grids, and plain gears. Trouble is more likely to arise on feeder control mechanisms through looseness than from other sources. Each part of the controlling device on each feeder should be tried out for looseness or wabble. If the supporting bearings are worn, as can be quickly found

out by moving the feeder to find side play, they should be repaired first because their repair may in turn bring the remainder of the control parts into good alinement and operation. Loose or worn pulleys and flat or vee-belts on feeders may be responsible, in some instances, for erratic control of the gin feed.

Trash disposal systems may be mechanical, pneumatic, or combinations of both. They differ with drum and extractor types of feeders but should be simplified where possible and thoroughly overhauled and repaired. Suction take-offs frequently become badly dented by abuse or by climbing over them to reach other things. The best remedy for such condition is to provide a substantial plank runway or platform over the main lint flue. When the gin is being made ready for the coming season, these changes in trash systems may be possible. If places of wear on elbows of trash suction or blow systems are given proper attention undue wear will be prevented and a better air flow provided to keep materials from building up and causing chokages. Half-filled trash pipes are not uncommon sights in poorly kept cotton gins, and even in some high-grade establishments the piping is so much oversize that good work is not done in removing the trash from the feeders and cleaners.

Modernizing Gin Stands

Gin-stand modernization helps to conserve the limited supply of new gin stands available to the industry and now being rationed by the War Production Board to meet the most urgent needs. It also offers greater capacity, thrifty savings over new machinery, and above all less rough ginning or poor preparation. Good ginning is more important than ever before in order to obtain maximum usefulness from the better grades of cotton and minimum interruptions to spinning operations. High grade manufactured products and full spinning capacity so vital to the war program can be more readily realized if each and every cause of rough preparation is eliminated.

It has been found in laboratory and field tests that the practice of operating with slow saw speeds is as much if not more responsible for rough ginning, in some instances, as poor condition of the gins, when dense seed rolls are resorted to by the ginner in order to obtain satisfactory ginning capacity. The operators of older designs of gins, where saws have been speeded up to 150 to 200 revolutions per minute beyond the speed originally provided for such types, have reported outstanding results from the standpoint of improved lint quality and increased ginning capacity as well as better lint turn-out and cleaner seed - all of which add to the value of the grower's cotton and to efficiency of gin operation at a time when such contributions are otherwise difficult to obtain.

In a majority of cases the change in saw speed can be readily made in slow-speed plants, especially if the gin outfit has an independent saw and brush type of drive. As compared to this kind of drive, change-overs in direct-connected saw-shaft installations present a greater number of problems; and the older type main drive, idler, tightener-lever and brush drive system make the speed change even more difficult to obtain. However, fewer and 1 out of 10 slow speed plants have this type of drive and probably less than 20 percent have the direct-connected drive. The independent saw-and-brush drive outfits are the most common.

Ordinarily, in the case of independent saw-and-brush drives, the line shaft is operated at 400 revolutions per minute. If the saws are running at 400 revolutions per minute also, both the driving and driven pulleys will be the same size, possibly 24 inches in diameter. To change the saw speed to 600 revolutions per minute, the driven pulley on the saw shaft would be reduced one-third in size, or to 16 inches. Of course, the driving pulleys on the line shaft can be increased in size to produce the same increases in saw speed but changes there are frequently more expensive than on the saw shaft. In the case of brush gins, the brush speed should not be changed. When the brushes are belted separately to the line shaft, their speed will be unchanged. However, if each is driven from its own saw cylinder, a larger pulley or other change will be required to bring them back to their original speed. If the gin is of the air-blast type, the nozzle pressure employed before the saw speed was increased can usually be maintained without changes in pulleys.

Gin stands, with main drive, idler, tightener lever, and brush drive all in one, may be modernized for higher speeds of saws and satisfactory operation by changing the stand to "independent-saw-and-brush" type of drive. These stands, made in both right and left hand models, usually have flat or ring oiling bearings for both saw and brush cylinders. The heavy wooden frames extend beyond the gin stand body so that the main belt pulley and idler mechanism are supported on an outboard portion of the frame. This outboard part would be cut off in converting the stands to independent saw-and-brush drive. Such conversion would also call for the end-to-end switch of either the brush or saw cylinder, as the case might be, so that the saw drive would be on the right end and the brush drive on the left end of the gin. If necessary the saw drives may be put on the left and the brush drives on the right. Pulleys for speeding up the saw cylinders must be selected to conform with the line-shaft speed. Screw-press gins have line-shaft speeds of about 200 revolutions per minute, while hydraulic-press gins employ a standard speed of 400 revolutions per minute.

Good wooden pulleys, second-hand steel pulleys, and cast-iron pulleys are more easily located in most areas than new steel split pulleys. Modifications of the sizes of pulleys, to suit any of the above types that are on hand, should be resorted to before applying for preference ratings to buy new steel pulleys.

It should be borne in mind that no speed, except that of the saws, is to be increased, and that the original speeds of brushes, picker-rollers, feeders, fans and other machinery items should be retained. When the feeders and picker rollers are driven from the saw shaft in either independent saw-and-brush or direct-connected drives, they are speeded up in proportion to saw speed increases; but in direct-connected drives other units may also be involved, such as fans, condenser, distributor, separator, and press pump. In either case, therefore, the feeder pulleys and other machine pulleys must be replaced with larger ones in order to retain the original speeds of everything but the saws. The picker rollers, however, can usually stand increased saw speeds up to 150 revolutions per minute, without needing larger driven pulleys, but above that point their pulleys would probably have to be changed. The change-over, therefore, is somewhat simpler with line-shaft than with direct-connected systems.

Speeding up of saws, in a few of the older forms of gin stands, may necessitate replacement of old huller ribs with late type "heavy-knuckle" designs to provide the most satisfactory huller-front action. This should be given consideration in estimating the cost of the modernization. If such a change is made, the gin-stand overhaul can best be accomplished at a repair factory.

The older types of gin stands can be greatly improved internally by providing metal covers over the dividing board and wind board by overhauling the gin flue, mote board, and space above the gin brush, and by complete repair of the rib assemblies. Full instructions for these improvements have been placed in the hands of State extension ginning specialists, and are also available from the Ginning Laboratory at Stoneville on mimeographed sheet ACE-137.

A most important precaution in modernizing old gin stands is to examine the condition of the bearings to make sure that there is no play in the saws or brushes. All of the bearings should be overhauled for continued long service, and be properly lubricated.

The experiences of both Laboratory workers and operating ginners thus stresses the importance of thorough gin-stand modernization in every particular, and the necessity for correct shapes and clearances in regard to mote-board lips, wind boards, dividing boards, and saw protrusion through the rib assemblies. The labor and time required to thoroughly overhaul and modernize the gin, as well as the cost of the materials, will be amply justified by the greater profits to producers and ginners.

Improving Lint-Handling Systems

The lint-handling system of a cotton gin may adversely affect the final appearance and quality of the cotton sample by producing intermittent damage, lumpy layering, and other objectionable effects on the sample. Almost every ginner having an obsolete or ill-kept gin has experienced some trouble with the lint-handling system. Heavy "tags" of lint, loaded with "pin" and "pepper" trash, that unexpectedly are released into the lint stream, big-ended bales, condenser chokages, back-lash, and other difficulties are among such troubles, but as a rule their cure is relatively simple and does not require a great deal of scarce material.

For all practical purposes, the actual beginning of the lint-handling system is at the brushes or airblast nozzles of the stands, where the ginned fiber first leaves the saws. It is necessary that the brushes be properly meshed into the saw teeth, or that the nozzles be correctly positioned, and that the speeds or pressures be right to produce the necessary air volumes for the lint-handling system and best doffing of the cotton. Contributing to the satisfactory delivery of the ginned lint into the lint-handling flues are the mote boards and moting lips of brush and airblast gins respectively, when in good condition.

So-called back-lash in most gins may be caused by too short an airblast moting lip, or by too much clearance between the bottom of the brush and the mote board. In either case, when the necessary channel for receiving the ginned lint into the flue system has not been provided, the lint escapes outside the stand through an easier pathway offered. The gin flues, which connect the

back of the stands to the main trunk lint flue, may cause considerable trouble if their surfaces are ragged, leaky, or rusty and rough. Wooden gin flues in the older gins become badly worn on their inside surfaces, especially at the top and sides, by erosive action of dirt and grit, becoming so splintered or rough as to cause cotton to cling to the surfaces and build up into dirty, troublesome wads before being finally blown loose. For this reason the application of metal protective surfaces to the interior parts of gin stands should be extended to also embrace the inside surfaces of wooden gin flues. In wartime, this lining may be of black metal, sanded and shellaced to avert rust and roughness. Faulty dampers at the terminals of these gin flues, where the gin and lint flues have their junctions, should be fully repaired. The latest types of lint-handling systems have eliminated such dampers, and it is possible that the same might be done in some of the older systems where it is seldom necessary to cut an individual stand out of service.

The main lint flue of a cotton gin too often receives severe abuse. It's top may be used for a runway platform in order to reach overhead machinery, or it may be used to support one end of a scaffold. Such abuses break the joints, bend the bands, dent in the rounded surfaces, and crack the inspection glasses. Since a smooth, unblemished interior of the lint flue is necessary for best operation, such damages may be expensive and call for special skill in repairing.

Near the condenser end of the horizontal run of the lint flue, an uptake elbow connects with the riser section. This should be cleaned, inspected, and shellaced after sanding off any rough surfaces. In the event that the gin has a cleaning device in the riser section, its screens, fastenings, dirt hoppers, latches, gaskets, and droppers should all be gone over and restored to good condition.

The lint flue proper terminates in a hopper or hood at the entrance to the condenser. From this point the lint spreads upon the drum and final effective cleaning should be accomplished by the conveying air and the drum screens. Within the hopper or entrance hood to the condenser may be located the deflector, which when properly adjusted, prevents big-ended bales from being formed. The deflector should be centrally located upon the upper surface of the hood and be made up with exterior adjustment and lock, so that it will be adjustable at all times and yet not build up any lint upon its guiding surfaces or base. When the gin-flue connections are round and enter the lint flue from beneath, more recent practice has been to locate a telescoping deflector in the gin-flue junction nearest to the condenser. Deflectors should be inspected and serviced regularly.

Within or on the body of the condenser the sealing strips, screened surfaces, access doors, shafting, bearings, rollers, and doffers should be kept in shape. The rainproofs, or shelter bonnets, and the air vent chambers at their base should be daily cleaned and periodically checked for tightness. Water-leaks from the dust flues cause the wood in condensers to rot. The sealing strips around the screen drum prevent leakage of lint cotton to the outside and should be carefully watched in all cases, particularly in side-draft condensers.

Obstructive piles of dirt tend to accumulate in up-draft and side-draft condensers requiring frequent cleaning. When this is done, many of the condenser troubles are fully eliminated.

At the condenser discharge, on the press side, the rollers and doffers require regular upkeep and attention. This requires scarce materials in the form of flexible strips and seals, but can be obtained from the manufacturers as "repairs" under very reasonable preference ratings. Discharge connections to the condenser from the lint slide should be made secure and the countershaft from which the apparatus is powered maintained in good condition.

Repairing and Maintaining Press Outfits

The uniform and compact packaging of cotton fiber into standard weight bales is a necessary factor in obtaining the full protection of quality. This not only insures protection of the contents of the bale but provides for more ease of handling in transportation and storage, as well as conservation of space. Good pressing and packaging save labor in many parts of the industry.

In the timely repair and early inspection of ginning equipment which should be as thorough as possible without using more critical materials than necessary, no machinery in the cotton gin should be overlooked, especially the press outfit which usually receives the least attention of all. If the press is not in working order the gin cannot function but with it in good condition the ginner may contribute very materially to better packaging, improved storage, and conservation of transportation space.

Beginning at the lint slide, which may be lacking in adequate length, slope, and terminal facilities, the overhaul work should continue in one section to the press boxes. If the lint slide tends to overhang the press box, it is probable that the driven pulley of the kicker will rub against the platen sills of the press, and be completely stopped when a bale is being pressed out because the slight upward movement of the platen sills may act as a brake upon the flange of the pulley. This in turn leads to condenser chokages if the lint slide is short; while the frictional wear of the pulley may seriously damage a wooden platen sill. All of the lint slide and its delivery mechanism should, therefore, be given proper adjustment, repair, and correct position.

The kicker wheel mechanism at the lower end of the lint slide may operate so that it causes rolling bales by unequal delivery of cotton to front or back of the box. If the kicker runs too slow the cotton is likely to fall at the back of the box, and if too rapid, it is thrown to the front. Speed regulation by installation of correct pulleys is necessary for uniform distribution. Certain makes of gins employ adjustable lips on the lower terminal of the lint slide. These should be set correctly in combination with the kicker. Types of kicker wheels with wooden paddles or sweeps become worn and so rough that the ginned lint wraps around them in a heavy mass. New paddles should be installed, and given ample shellacing and varnishing to produce a perfectly smooth, sturdy kicker that does not strike either the lint slide or the tramper gates. Timing of the kicker, as well as its actual speed, is very important to good tramping and pressing. In the older style gear trampers which have a sort of sweep motion, failure to maintain correct timing is likely to be the difficulty, and the sweep must be clocked into the cycle so that its action is uniformly set for lint delivery to the boxes.

The entire structural frame of the press should be alined, leveled, and plummed before undertaking repairs to tramper and press parts. This work is particularly necessary before making other repairs so that the tramper gate